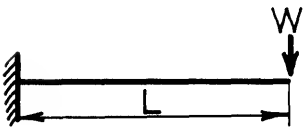
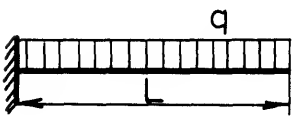
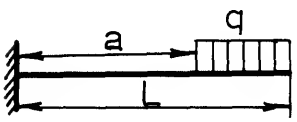
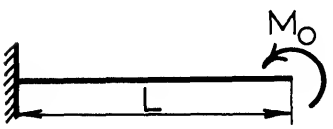
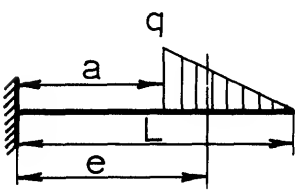
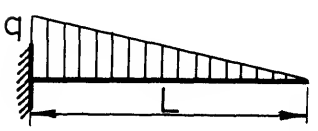
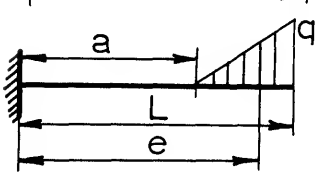
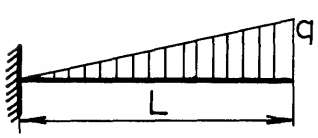
Table 20.1 Maximum Deflections and Moments for Cantilever Beams

	Maximum Bending Moment	Maximum Deflection
	$M = WL$	$Y_b = \frac{WL^2}{3EI}$
	$M = \frac{qL^2}{2}$	$Y_b = \frac{qL^4}{8EI}$
	$M = \frac{q(L^2 - a^2)}{2}$	$Y_b = \frac{q(L-a)[6L(L+a)^2 - 3a(a^2+2L^2)]}{48EI}$
	$M = M_0$	$Y_b = -\frac{M_0 L^2}{2EI}$
	$M = \frac{qe(L-a)}{2}$	$Y_b = \frac{q(L-a)[14(L-a)^3 + 405Le^2 - 135e^3]}{1620EI}$ $e = \frac{2a+L}{3}$
	$M = \frac{qL^2}{6}$	$Y_b = \frac{qL^4}{30EI}$
	$M = \frac{qe(L-a)}{2}$	$Y_b = \frac{q(L-a)[17(L-a)^3 + 90e^2(7L-a)]}{3240EI}$ $e = \frac{a+2L}{3}$
	$M = \frac{qL^2}{3}$	$Y_b = \frac{11qL^4}{120EI}$

The strain energy due to shear for an elementary volume ($bL\,dx$) parallel to the neutral axis, is expressed in terms of Eq. (20.19a)

$$dU_S = \left[\frac{6W}{bh^3}\left(\frac{h^2}{4} - x^2\right)\right]^2 \frac{bL\,dx}{2G} \tag{20.19b}$$